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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/518,127

Filing Date: July 25, 2005

Appellant(s): GONG ET AL.

NANCY T. KRAWCZYK  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 2/17/09 appealing from the Office action mailed 9/15/08.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct. The examiner substantially agree noting: claims 1-3, 5, 9-11, 14, 16, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629) in view of Patil (US 5,498,673), when taken with Li *et al.* (US 6,060,549); and claims 22-23, and 29-32, 36-38, 40, 42, 45, and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629) in view of Patil (US 5,498,673), when taken with Li *et al.* (US 6,060,549).

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,807,629	ELSPASS et al.	9-1998
5,498,673	PATIL	3-1996
6,060,549	LI et al.	5-2000

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5, 9-11, 14, 16, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629) in view of Patil (US 5,498,673), when taken with Li *et al.* (US 6,060,549).

Regarding claims 1-3, 5, and 9-11: Elspass *et al.* teaches a nanocomposite (1:5-7) comprising clay {layered materials, which can be modified with swelling agents (exfoliated)} (2:33-63) and an elastomer comprising copolymers of isobutylene [instant claim 5] and functionalized paramethyl styrene [instant claims 2-3, and 9-10] (2:10-17), wherein the nanocomposite has sufficiently low air permeability to be useful as a tire inner liner (1:60-67).

Elspass *et al.* does not teach a monomer functionalized with groups (I-V) of instant claim 1. However, Patil teaches copolymers of isoolefins and para-alkylstyrenes (1:5-6) functionalized with an R<sub>4</sub> moiety corresponding to instant groups (I-V) {R<sup>1</sup> = h, x = 2-10, y = 0-20} [instant claim 1] (1:29-2:38). Patil disclose a copolymer of isobutylene and para-methylstyrene, which contained 15 wt% of para-methylstyrene and the remainder of isobutylene, wherein the copolymer was functionalized (2:65-4:49), wherein the functionality with para-methylstyrene

was uniformly distributed over the entire molecular weight range [instant claim 11] (4:37-49). Elspass *et al.* and Patil are analogous art because they are concerned with a similar technical difficulty, namely the preparation of copolymers of isoolefins and functionalized para-alkylstyrenes. At the time of invention a person of ordinary skill in the art would have found it obvious to have combined the para-alkylstyrenes functionalized with R<sub>4</sub> groups, as taught by Patil in the invention of Elspass *et al.*, and would have been motivated to do so since Patil suggests that such groups have particular utility in forming polymer blends (1:58-59) and is an equivalent alternative means of providing copolymers of isoolefins and functionalized para-alkylstyrenes.

The Office realizes that all the claimed effects or physical properties are not positively stated by the reference. However, the reference teaches all of the claimed reagents. Therefore, the claimed effects and physical properties, i.e. a permeation coefficient of less than 7 mm·cc/(m<sup>2</sup>·day·mmHg) at 40 °C [instant claim 1], would implicitly be achieved by a composition with all the claimed ingredients. If it is the applicants' position that this would not be the case: (1) evidence would need to be presented to support applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties and effects with only the claimed ingredients.

Li *et al.* provides evidence that layered clay materials, when intercalated by treatment with swelling agents, affords a layered silicate that can more readily sorb polymeric material between the layers, thereby providing a uniform dispersion of the exfoliated layers within the polymer matrix (6:25-7:49).

Regarding claim 14: Elspass *et al.* teaches clay in an amount of 0.1 to 80 wt% of the nanocomposite (3:3-7).

Regarding claim 16: Elspass *et al.* teaches carbon black (4:50-51).

Regarding claim 19: Elspass *et al.* teaches a secondary rubber {polybutadiene rubber} (3:32-46).

Regarding claim 20: Elspass *et al.* teaches an inner tube (3:29-31).

Claims 22-23, and 29-32, 36-38, 40, 42, 45, and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629) in view of Patil (US 5,498,673), when taken with Li *et al.* (US 6,060,549).

Regarding claims 22-23, and 29-32, and 36-37: Elspass *et al.* teaches a method for preparing a nanocomposite (1:5-7) comprising contacting clay {layered materials, which can be modified with swelling agents (exfoliated)} (2:33-63) with an elastomer comprising copolymers of isobutylene [instant claim 31] and functionalized paramethyl styrene [instant claim 30 and 36] (2:10-17), and a grafting a promoter {curing package} (4:54-57) [instant claim 22], wherein the elastomer is first contacted with the functionalizing compound (2:18-32), followed by contacting with the clay and melt blended [instant claim 23] (3:10-30; 5:65-6.27).

Elspass *et al.* does not teach a method utilizing the functionalizing compounds listed in instant claims 22 and 29. However, Patil teaches copolymers of isoolefins and para-alkylstyrenes (1:5-6) functionalized with anhydrides, acylhalide, or lactones, specifically acetyl chloride [instant claim 22] and maleic anhydride [instant claim 29] (1:29-2:38). Patil disclose a copolymer of isobutylene and para-methylstyrene, which contained 15 wt% of para-methylstyrene and the remainder of isobutylene, wherein the copolymer was functionalized (2:65-4:49), wherein the functionality with para-methylstyrene was uniformly distributed over the entire molecular weight range [instant claims 32 and 37] (4:37-49). Elspass *et al.* and Patil are analogous art because they are concerned with a similar technical difficulty, namely the preparation of copolymers of isoolefins and functionalized para-alkylstyrenes. At the time of invention a person of ordinary skill in the art would have found it obvious to have combined the functionalizing compounds {yielding R<sub>4</sub> groups}, as taught by Patil in the invention of Elspass *et al.*, and would have been motivated to do so since Patil suggests that such functionalizing compounds {yielding R<sub>4</sub> groups} have particular utility in forming polymer blends (1:58-59) and is an equivalent alternative means of providing copolymers of isoolefins and functionalized para-alkylstyrenes.

The Office realizes that all the claimed effects or physical properties are not positively stated by the reference. However, the reference teaches all of the claimed reagents. Therefore, the claimed effects and physical properties, i.e. a permeation coefficient of less than 7 mm·cc/(m<sup>2</sup>·day·mmHg) at 40 °C [instant claim 23], would implicitly be achieved by a

composition with all the claimed ingredients. If it is the applicants' position that this would not be the case: (1) evidence would need to be presented to support applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties and effects with only the claimed ingredients.

Li *et al.* provides evidence that layered clay materials, when intercalated by treatment with swelling agents, affords a layered silicate that can more readily sorb polymeric material between the layers, thereby providing a uniform dispersion of the exfoliated layers within the polymer matrix (6:25-7:49).

Regarding claim 32: Elspass *et al.* the styrene derived units are present in 5.5 wt% (10:49-50).

Regarding claim 38: Elspass *et al.* teaches the clay, layered materials, can be modified with swelling agents (exfoliated) via alkylammonium salts (2:33-63).

Regarding claim 40: Elspass *et al.* teaches the clay {layered material} is in an amount of 0.1 to 80 wt% of the nanocomposite (3:3-7).

Regarding claim 42: Elspass *et al.* teaches carbon black (4:50-51).

Regarding claim 45: Elspass *et al.* teaches a secondary rubber {polybutadiene rubber} (3:32-46).

Regarding claim 73-74: Elspass *et al.* teaches a tire inner liner (2:1-3; 3:29-31) and innertube [instant claim 74] (3:29-31; 12:21-26).

## **(10) Response to Argument**

Appellant's arguments filed 2/17/09 have been fully considered but they are not persuasive. The rejection of claims 1-3, 5, 9-11, 14, 16, 19-20, 22-23, 29-32, 36-38, 40, 42, 45, and 73-74 based on Elspass *et al.* (US 5,807,629) and Patil (US 5,498,673) when taken with Li *et al.* (US 6,060,549) is maintained for reason of record and following response.

It is noted that appellant's have argued all pending article claims and all pending method claims finally rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629) in view of Patil (US 5,498,673), when taken with Li *et al.* (US 6,060,549) as a single argument and is deemed clear.

Elspass *et al.* (US '629) discloses a nanocomposite (1:5-7) comprising clay {layered materials, which can be modified with swelling agents (exfoliated)} (2:33-63), and an elastomer comprising copolymers of styrene-butadiene {Ex. 1}, as well as copolymers of isobutylene and functionalized paramethyl styrene (2:10-17), wherein the nanocomposite has sufficiently low air permeability to be useful as a tire inner liner (1:60-67). Elspass *et al.* (US '629) discloses a solid rubber is blended with the nanocomposite material (3:37-46). A masterbatch of the nanocomposite is prepared {Ex. 1} then blended with a solid rubber {Ex. 2} (3:60-4:45), i.e. a blended nanocomposite dispersion was formed (4:14:25). While the masterbatch of example 1 utilizes a styrene-butadiene elastomer (3:60-4:11), Elspass *et al.* (US '629) clearly discloses elastomers based on a copolymer of isobutylene and functionalized paramethyl styrene (2:10-17) can be used as the elastomer in the nanocomposite. Elspass *et al.* (US '629) dose not disclose the specific functional groups appended to the copolymer of isobutylene and functionalized paramethyl styrene as required in instant claim 1.

Patil (US '673) discloses copolymers of isoolefins and para-alkylstyrenes (1:5-6) functionalized with an R<sub>4</sub> moiety corresponding to instant groups (I-V) {R<sup>1</sup> = h, x = 2-10, y = 0-20} (1:29-2:38). Patil (US '673) disclose a copolymer of isobutylene and para-methylstyrene, which contained 15 wt% of para-methylstyrene and the remainder of isobutylene, wherein the copolymer was functionalized (2:65-4:49) and the functionalized para-methylstyrene was uniformly distributed over the entire molecular weight range (4:37-49). Patil (US '673) suggests that such R<sub>4</sub> groups have particular utility in forming polymer blends (1:58-59).

A person having ordinary skill in the art would contemplate utilizing a copolymer of isobutylene and functionalized paramethyl styrene in the formation of a tactodial nanocomposite in view of the fact that Elspass *et al.* (US '629) clearly discloses elastomers based on a copolymer of isobutylene and functionalized paramethyl styrene (2:10-17) can be used as the elastomer in the nanocomposite. Additionally, a person having skill in the art would have found it obvious to have utilized functionalized para-methylstyrene-isobutylene copolymers of Patil (US '673) {functionalized with R<sub>4</sub> groups} in the composition of Elspass *et al.* (US '629) {clay and isobutylene-functionalized paramethyl styrene nanocomposite}, as such R<sub>4</sub> functionalized para-methylstyrene-isobutylene copolymers have particular utility in forming polymer blends

[Elspass *et al.* (US '629) discloses a solid rubber is blended with nanocomposite material {clay and isobutylene-functionalized paramethyl styrene nanocomposite} (3:37-4:46, Ex. 1-2)].

In response to appellants' argument that the functionalized isobutylene and para-methylstyrene copolymers of Patil (US '673) will not function as an equivalent alternative to solid rubber disclosed in Elspass *et al.* (US '629); the functionalized isobutylene and para-methylstyrene copolymers of Patil (US '673) would be employed as the elastomer component in Elspass *et al.* (US '629) (2:9-17). Elspass *et al.* (US '629) discloses elastomers such as styrene-butadiene and functionalized isobutylene and para-methylstyrene copolymers are utilized as the elastomer component in the tactodial nanocomposite; i.e. substituting the functionalized isobutylene and para-methylstyrene copolymers for the styrene-butadiene copolymer in Ex. 1-2 (3:60-4:45). The functionalized isobutylene and para-methylstyrene copolymer is an equivalent alternative for the styrene-butadiene copolymer.

In response appellants' argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Patil (US '673) suggests copolymers of isobutylene and para-methylstyrene (1:5-6) functionalized with anhydrides, acylhalide, or lactones {ex. acetyl chloride and maleic anhydride affording para-alkylstyrenes functionalized with R<sub>4</sub> groups} (1:29-2:38) provide copolymers having functional groups that have particular utility in forming polymer blends (1:58-59).

Based on the response above, a person having ordinary skill in the art would utilize the functionalized isobutylene and para-methylstyrene copolymers of Patil (US '673) as the elastomer component in Elspass *et al.* (US '629) because: Elspass *et al.* (US '629) discloses the use of functionalized isobutylene and para-methylstyrene copolymers as the elastomer component in a nanocomposite material masterbatch, which is subsequently blended with a solid rubber; Patil (US '673) suggests functionalized copolymers of isobutylene and para-

methylstyrene {para-alkylstyrenes functionalized with R<sub>4</sub> groups} provide copolymers having functional groups that have particular utility in forming polymer blends.

Li *et al.* (US '549) was relied on as evidence that layered clay materials, when intercalated by treatment with swelling agents, affords a layered silicate that can more readily sorb polymeric material between the layers, thereby providing a uniform dispersion of the exfoliated layers within the polymer matrix (abstract, 6:25-7:49). Li *et al.* (US '549) does not have to be analogous art, as it was applied as an evidentiary reference.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Michael Pepitone/

Examiner, Art Unit 1796

Conferees:

/Mark Eashoo/

Supervisory Patent Examiner, Art Unit 1796

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Supervisory Patent Examiner, Art Unit 1796